Application of Cloud Storage in the Data Bank of Teaching resources of Plane Design Specialty

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***Abstract*—Cloud storage is a new type of concept of digital information storage. In view of its advantages in distributed storage, collaborative storage, dynamic allocation storage space, smooth migration and backup, on the basis of the introduction of related concepts and unique advantages of cloud storage, the present essay introduced cloud storage into the data bank of plane design materials, and constructed a scheme of cloud storage of the data bank of the plane design materials from the three aspects of system structure, topological structure and function module.**

Keywords- cloud storage, plane design, data bank of teaching resources

I. CLOUD STORAGE

Cloud storage is a new concept developing and extended from the concept of cloud computing. It is a system that, through functions of cluster application grid technology or distributed file system, and so on, gathers together a large number of different types of storage equipment to work coordinately through the application software, to provide functions of data storage and business access to the outside world. [1]When the cloud computing system operation and the core of the process is the storage and management of the large amounts of data, cloud computing system will need to be configured a lot of storage equipment, then cloud computing system is transformed into a cloud storage system, so cloud storage is a cloud computing system centered on data storage and management.[2]

A. Features of cloud storage system:

Cloud storage system should have the following general features:

- High scalability: cloud storage system can support the processing of mass data. The resources can be expanded to meet the needs;
- Low cost: cloud storage system should have the characteristics of high performance. Its low cost embodies in two aspects, that is, lower construction cost and lower cost of operation and maintenance;
- No access restrictions: compared with the traditional storage, cloud storage emphasizes on the flexible support of users' storage, the storage resources in service domain can access and visit at any time;
- Easy management: a small number of administrators can handle thousands of nodes and P level storage, support more efficiently a large number of demand of application on the quick deployment of storage resources.

B. Structure model of Cloud storage

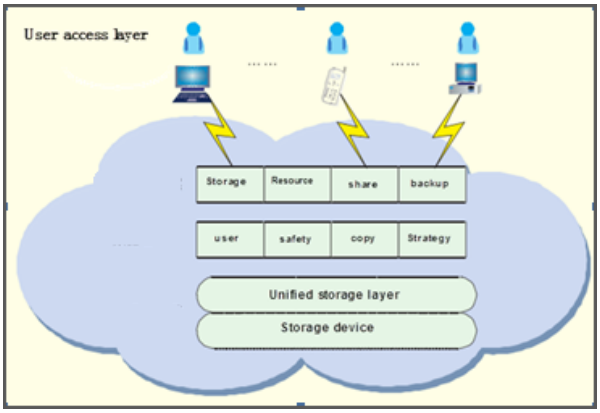

Figure 1. Structure model of cloud storage

Compared with the traditional storage devices, cloud storage is not only a hardware, but a complex system composed of network equipment, storage equipment, server, application software, public access interface, access net, client program, and other parts. The structure model of cloud storage system consists of 4 layers. [3]

1) Storage layer

Storage layer is the most basic part of cloud storage. Storage devices can be FC fibre channel storage equipment, or IP storage equipment, such as NAS and iSCSI. Storage devices in cloud storage are often large in number and distributed in different regions, they connect with each other through the wan, Internet or FC fibre channel network. Various service data put in cloud storage system form a mass data pool. The main function of the data storage layer of cloud storage is to interconnect up different types of storage devices to realize the unification of massive data

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management, and, at the same time, to realize the centralized management, logic virtualization management, condition monitoring and the dynamic expansion of capacity of the storage devices. In essence it's a kind of service-oriented distribution-fashioned storage system.

2) Basic management

Basic management is the core part of cloud storage, and also the most difficult part to achieve. Basic management realizes the collaborative work between the multiple storage equipment in cloud storage through the cluster, distributed file system and grid computing technology, and makes more storage equipment can provide the same kind of service, and provides the bigger, stronger and better performance of data access .[4]

In this layer, content distribution system, data encryption technology and so on can be accessible, and cloud storage of data will not be accessed by unauthorized users. At the same time, all kinds of data backup, disaster recovery technology and measures can ensure that the cloud storage data will not be lost, and ensure the cloud storage's security and stability.

3) Application interface layer

Application interface layer is the communication part between cloud storage and the practical application . Different cloud storage applications can be used according to the actual demand, to develop different application service interface, and provide different application services, such as network hard disk file service, online service and online backup service and so on. At the same time, in this layer , a good implementation of user authentication, access control and other security strategy can be achieved.

4) Access layer

Any authorized user can login cloud storage system and enjoy cloud storage service through the standard public application interface.[5]

C. Present situation of cloud storage development

At present ,many large network storage service provider has carried out cloud storage services, such as the Amazon company network service (Amazon Web Services, AWS), Google's cloud computing Storage Services (Google Storage), EMC cloud Storage base frame solution (Atoms). In addition Microsoft, HP, IBM and other companies have launched their own cloud Storage strategy and platform. Overall, most cloud storage is developed and promoted by commercial IT company. It is has not formed a unified standard in the industry.

D. The difference between the network and hard disk

1) Easier to use. The document is stored in the local fast plate folder. Then it will automatically be uploaded to the Internet. This mode of operation is simple and convenient than the webpage uploads.

*2) To avoid duplication of work.*Traditional disk to save the file is very cumbersome, such as frequently used FTP. It needs repeated login, upload, download. Every edit needs repeat the above processes. In the pursuit of quick office today, fast disk may help us automatically.

3) File update is completed by one step. The file in traditional disk is generally downloaded to view. It can not be stored in disk directly, but fast disk can be directly in the fast disk to open, update files, are finished in one step.

4) Data security is more secure. The fast disk with distributed key generation system generates dynamic keys to encrypt files, so the contents transmitted on the network and stored in the server are highly encrypted, even operation maintenance personnel cannot crack the file. For example, as a leading domestic cloud storage service provider, kingsoft disks service has sufficient reserves in technology, capital, and hardware to guarantee the long-term operations of the service and won't appear "no food" dilemma.

II. PRESENT SITUATION OF GRAPHIC DESIGN PROFESSIONAL TEACHING RESOURCES LIBRARY

A. The classification of graphic design professional teaching resources library

At present, graphic design professional teaching resources library in the Department of Fine Arts can be mainly divided into the following several aspects: first, the massive picture material library. Second, teachers' accumulated electronic courseware and case . Third, students design works. Fourth, the multimedia teaching video, VCD and CD. Fifth, scanned or downloaded electronic books. The characteristics of these educational resources are miscellaneous types, quantity, large capacity, and increasing year by year, especially the graphic design pictures. [6] They are the original material of the graphic design with wide range of subjects, involving nature, life and works of art and other aspects. There are 20000 images, including human 4500 pieces, natural landscape 8800 pieces, building 3000 pieces, the humanities art 2000 pieces and 6500 pieces of other kinds . Of course, there is a growing trend.

B. Storage Methods of Resources

Currently, Graphic design major has not yet purchased special storage device to store the valuable resources; they store them in different computers or mobile hard disk or even engrave them on the disc instead. From the technical point of view, it is far from a good solution. Such a storage Method has the following defects.

At first, the capacity is limited. Even a dedicated computer is hard to store these resources, for the quantity of information, increasing by geometric digit, can easily break through the hard disk capacity.

Second, it has a lower level of security. Without specialized personnel management, teachers or students can open or copy the information with a U disk. The computer, therefore, is exposed to virus, likely causing an operating system crash or data loss. If the data can not be recovered, those valuable resources accumulated over years will be ruined.[7]

Third, a hard disk or CD has a service life, fear of rattling, scratching, and bending. Over use will make bad sectors. If a hard disk or CD fails, a large amount of data will be lost.

Fourth, the resources can be hardly shared. It is impossible to share resources for they are placed in different computers or stored in multiple discs.

Fifth, there is a lack of professional maintenance personnel. The heterogeneous database demands proficient professionals for maintenance of hardware, software and network systems, and sorting the data at any time.

Sixth, data searching is time consuming. None of the pictures in the recourses have been marked with any text, so the arrangement is not professional, systematic or integrate. As a result, search is meaningless, and if you want to find a picture, you have to take a painstaking look at the pictures one after another.

In summary, cloud storage is a feasible solution to such problems.

III. The Employment of Cloud Storage in Graphic Design Teaching Resources

With Cloud storage, we need not think more about the equipment, the way of interface, transport protocol, storage system capacity, data copying and other problems. User does not need to care about the monitoring and maintenance of storage device state, and the update and upgrade of hardware and software.

All devices in the cloud storage system are completely transparent to their users. Any authorized user can make access to the data in cloud storage anywhere through an access cable, as shown in Figure 2.

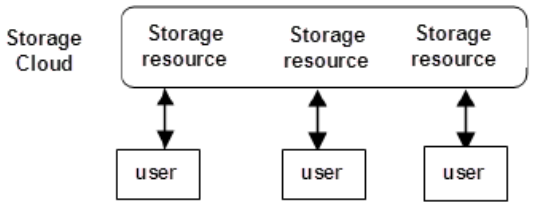

Figure 2. cloud storage service

The employment of cloud storage in graphic design professional teaching database can be embodied in the following aspects:

A. *It makes information-searching more convenient*

In graphic design teaching, teachers need to prepare a large number of material and courseware in advance, so it is necessary for them to carry a laptop or portable U disk. They either worry about virus infection or documents missing or damaged. With cloud storage, they can store their courseware, video, material, and cases in the cloud disk. In that case, whether the teacher is in a computer hall or in classroom, so long as the network is accessible; so long can he use or modify his data as to reduce the chance of infection.[8]

B. *It makes sure of data synchronizing update*

Every year the courseware needs to be modified and copied, and students' design work will be repeatedly revised. We have to copy each revised edition in a U disk or elsewhere, but after a period, we will find it hard to find out which is the latest and most complete. Cloud storage provides synchronization capabilities so that we do not necessarily worry about the storage time. All we should do is to concentrate on edition and timely save. Anytime when detecting revision, cloud storage server will automatically update documents on the network to keep them up-to-date.

C. *Resource sharing and Network teaching*

Cloud storage can be used by teachers to upload their own courseware and a file or a folder can be shared with other teachers by the way of "sharing with friends". Both sides will see the shared files in the cloud disk. In addition, the files can be setted as "generating a download link", which can be informed to others. At the same time, there should be a download password and carry on authorization download operation.

In the network teaching activities, teachers give comments and modifying supplement to students based on their homework, which should be synchronously seen by students and the interaction and collaboration between students and teachers can be easily achieved. Teachers can observe and understand students' learning at any time and make timely adjustments to improve teaching quality. In addition, cooperative learning and discussion can be organized between students from different disciplines and classes; Learning experiences and learning resources are shared and learning tasks is accomplished together, with a purpose to realize multi-disciplinary and cross-learning.

D. *Extension of classroom teaching*

Cloud disk can be seen as the extension of the classroom teaching, and teachers can share the necessary learning material with students quickly by using cloud disk. Once students have anything unclear, they can open cloud disk to see shared content and have a relearning so as to achieve the purpose of learning more. Homework can also be shared with teachers at any time or shared between students. In addition, the teaching content which is not suitable to extend in class can be given to students to learn by themselves. Through repeated viewing or practice, the original fuzzy knowledge will be intensified and understood. From this perspective, cloud storage will greatly enrich the teaching, and becomes a strong complement to classroom teaching, and also provides a new way of thinking to explore new teaching mode.

E. *Provide a reliable and secure data storage center*

In network era, virus and hacker attacks is changing, how to guarantee the security of data storage is particularly important in the case of lack of information security professional management repository. Cloud storage technology provides professional, efficient and secure data storage, maintenance and custody for colleges and universities to establish a reliable and secure data storage center. Cloud storage data saves a copy in each terminal and remote cloud disk, which is available to edit at any time. If any terminal failed, data can be recovered remotely. Even if it is accidentally deleted, you can still recover it from a remote Recycle Bin, which greatly reduces the risk of data loss, and thus do not have to worry about data loss problems caused by the virus, hacker attacks and hardware damage.

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IV. CONCLUSION

Teaching resources construction is an important part of the development of modern education. Integration of teaching resources, and is conducive to the sharing of teaching resources, and reduce the cost and improve the quality of teaching of teaching. Cloud storage, as a new form of service in education, will integrate all teaching resources, including text, graphics, images, animation, sound and video, which is in favor of using teaching material reasonably and efficiently, and thereby promote the improvement of teaching quality. With the continuous development and improvement of cloud storage, it is bound to have more and more applications in the institutions of higher learning and education network.

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